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ABSTRACT

This learning module provides students with practice in applying mathematical operations to vocational agriculture. The module consists of unit objectives, definitions, information, problems to solve, worksheets suitable for various levels of vocational agriculture instruction, and answer keys for the problems and worksheets. This module, which covers common fractions, provides practice in addition and subtraction, multiplication and division of fractions, and combined operations with common fractions. Practical applications include computing a bill of materials for a construction project, measuring and sawing lumber, and correctly applying a herbicide for common weeds in crops. (KC)

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COMMON FRACTIONS

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TEACHING UNIT: **COMMON FRACTIONS**

TRAINING ACTIVITIES : (1) Addition and subtraction of common fractions

(2) Multiplication and division of common fractions

(3) Combined operations with common fractions

UNIT OBJECTIVES : (1) To provide experiences which will enable students to write equivalent fractions in lowest terms.

(2) To provide experiences which will enable students to become more efficient in basic computational skills involving fractions.

(3) To present arithmetic concepts of working with common fractions in a manner keeping with the interest of vocational agriculture students.

DEFINITIONS :

FRACTION - A number expressed in the form "a " divided by "b", where "a" and "b" are whole numbers and "b" is not equal to "zero". A fraction is usually written in the form "a/b" with "b" not equal to "zero".

DENOMINATOR - The bottom number of the fraction. This number represents the number of equal parts into which the whole is divided.

NUMERATOR - The top number of the fraction. This number indicates the number of parts of the whole quantity being expressed by the fraction.

PROPER FRACTIONS - A fraction in which the numerator (the top number) is smaller than the denominator (the bottom number).

IMPROPER FRACTIONS - A fraction in which the numerator (the top number) is larger than the denominator (the bottom number). An improper fraction represents more than a whole quantity.

MIXED NUMBER - An improper fraction written as a whole number plus a fraction.

1 ------ numerator
2 ------ denominator

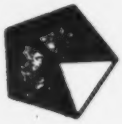
3/4 = Proper Fraction
4/3 ------ Improper Fraction
1 1/3 ------ Mixed Number

NAME _____

Addition and Subtraction of Common Fractions

INSTRUCTIONS: Perform the indicated operations, expressing the results in lowest terms.

A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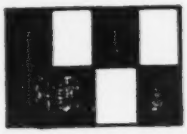

C

D

(1.) Write the fraction that tells how much of each of the above figures are colored.

(a)_____ (b)_____ (c)_____ (d)_____

(2.) Write the fraction that tells how much of each of the above figures are not colored.

(a)_____ (b)_____ (c)_____ (d)_____

(3.) Write equivalent fractions in lowest terms for the following:

(a) 6/8 inch = _____ inch (b) 5/10 inch = _____ inch

(4.) Write the following as equivalent numerals in mixed number form:

(a) 75/16 inches = _____ in. (b) 135/12 inches = _____ in.

(5.) Which is smaller, 4/5 acre or 6/11 acre? _____

(6.) Which piece of plywood is the thickest, 3/4 inch, 5/8 inch or 1/2 inch? _____

(7.) John fed his steer 7 3/5 pounds feed and Susan fed her steer 9 1/2 pounds feed. How much feed did it take to feed both steers?

(8.) Billy has one piece of wood that is 1 3/8 inches thick and one piece that is 3/4 inch thick. If he glues the two pieces of wood together, how thick will his piece of wood be?

(9.) John bought 1 1/2 pounds of seed corn, 1/3 pound of pumpkin seed and 1/16 pound of lettuce seed. How many pounds of seed did he buy?

(10.) Bill has a board that is 14 7/8 inches long. It is 1/2 inch shorter than what he needs. How long of a board does Bill need?

NAME_____

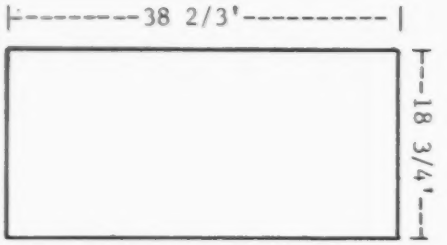
Multiplication and Division of Common Fractions

INSTRUCTIONS: Perform the indicated operation, expressing the results in lowest terms.

(1.) 160 3/10 miles ÷ 5 1/2 gallons = _____ miles per gallon.

(2.) 10 acres is 2/5 of what number of acres? _____ acres

(3.) How many 1/16 inch segments are in 1 3/4 inches? _____



(4.) A hog house has an inside measurement of 38 2/3 feet long and 18 3/4 feet wide. The area of the floor is _____ square feet

(5.) If a farm fuel storage tank holds 475 gallons when full, how many gallons of fuel will be in the tank when it is 1/3 full? _____ gallons

(6.) A farmer can cut a 7 3/5 feet swath with her mower. How many swaths will she have to cut to mow a field of hay which is 836 feet wide? _____

(7.) A tractor uses 2 7/8 gallons of fuel per acre when plowing and plows 2 1/2 acres per hour. How much fuel does the tractor use per hour when plowing? _____ gallons

(8.) If approximately 2/3 of the live weight of a hog ends up as edible meat, how many pounds of meat would you get from a 225 pound hog? _____ pounds

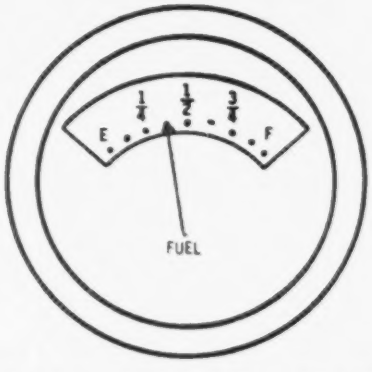
(9.) If Joe can disk 7 1/4 acres per hour with his tractor and disk, how many hours will it take him to disk 58 acres? _____ hours

(10.) If a farmer is planting 2 1/2 bushels of wheat per acre, how many bushels of seed will be needed to plant a 55 acre field? _____ bushels

NAME _____

Combined Operations With Common Fractions

INSTRUCTIONS: Perform the indicated operations, expressing the resulting fractions in lowest form.



(1.) Assume that a tractor's fuel tank holds 48 gallons fuel. If the fuel gauge shown above is correct, how many gallons of fuel are in the tank? _____ gallons

(2.) When Sue bought her FFA steer it weighed 438 pounds. She has had the steer for 41 days and it has averaged gaining 2 1/4 pounds per day. How much does the steer now weigh? _____ pounds

(3.) Farmer Smith has two combines. He can harvest 2 1/8 acres per hour with one and 1 1/2 acres per hour with the second. How long would it take the two machines working together to harvest an 87 acre field? _____ hours

(4.) Diesel fuel cost $1.18 per gallon. If Mr. Jones can drive his farm truck 17 1/2 miles per gallon of fuel, how much will the fuel cost to drive 385 miles? $ _____

(5.) The formula for finding board feet is (number of pieces x thickness in inches x width in inches x length in feet ÷ 12). How many board feet are in an eight foot 2 x 4? _____ bd. feet

(6.) Bob Clark has an eighteen-acre apple orchard. He has 48 trees per acre and harvested an average of 11 1/2 bushels per tree last year. At this rate, how many bushels of apples did he harvest from the orchard? _____ bushels

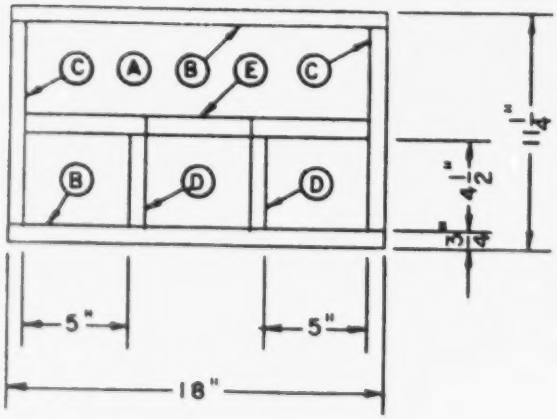
Name _____

WORKSHEET

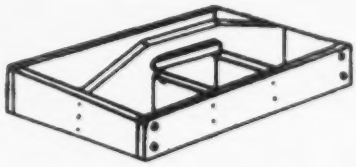
COURSE: **Introduction to Agriculture and Natural Resources**

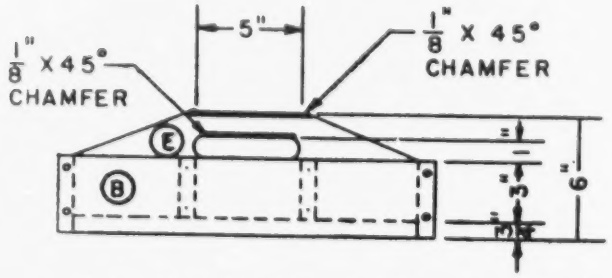
COMPETENCY: #017 - "Compute accurately a bill of materials for a construction project"

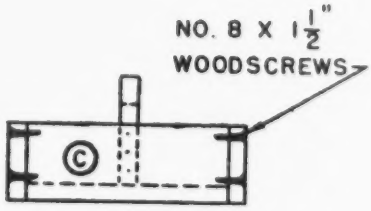
INSTRUCTIONS: With the information provided, solve the following problems.



NAIL BOX







1. From the plan above, determine the size of the following: (Thickness x width x length.)
   a. the bottom (A) ..... _____" x _____" x _____".
   b. the sides (B) ..... _____" x _____" x _____".
   c. the ends (C) ..... _____" x _____" x _____".
   d. the partitions (D) ..... _____" x _____" x _____".

2. Assuming that you plan to purchase 1" x 12" pine shelving board to make the nail box, what length board must you purchase? (*NOTE:* 12" shelving board is actually .75" thick x 11.5" wide and you can only purchase in even feet lengths.) _____ feet.

NAME _____

WORKSHEET

COURSE: Introduction to Agriculture and Natural Resources

COMPETENCY: #018 - "Measure, Mark and Saw Lumber to Within 1/16" Accuracy"

INSTRUCTIONS: Solve the following problems by looking at the ruler and expressing answers in simplest form:

1. What is the sum of the lengths of segments AB and AE?
   _____ inches.

2. What is the sum of the lengths of segments AC and AD?
   _____ inches.

3. Segment AF is how much longer than segment AE?
   _____ inches.

4. What is the combined length of three objects whose lengths are indicated by segments AB, AC, and BD? _____ inches.

5. If you cut a piece of wood which is equal in length to segment AF in half, using a saw blade which is 1/8 inch wide, what will be the length of each sawed piece? (***NOTE***: To solve, the width of the saw blade must be subtracted.) _____ inches.

NAME _____

WORKSHEET

COURSE : **Agricultural Production I**

COMPETENCY : #019 - "Select and correctly apply a herbicide for common weeds in crops"

INSTRUCTIONS : Complete the following problems.

USE DIRECTIONS

WEED CONTROL IN CORN: Use one of the following three programs: **Preemergence:** Apply 1⅓ to 2⅔ pints per acre to soil anytime after planting but before corn emerges. Do not use on light sandy soil. **Emergence:** Apply ⅔ pint per acre just as corn plants are breaking ground. **Postemergence:** After emergence of corn, use ⅓ pint per acre. Application of ½ to ⅔ pint per acre may be needed for maximum control of some weeds but such rates are more likely to injure the corn. If corn is over 8 inches tall, use drop nozzles to keep the spray off the corn foliage as much as possible. Do not apply from the tasseling to dough stage. Do not use with oil, atrazine or adjuvants. Crop injury is more likely to occur if corn is growing rapidly under high temperature and high soil moisture conditions.

1. According to the the directions above, how many gallons of herbicide would be needed for the pre-emergence program for 140 acres of corn?
   _____ to _____ gallons.

2. How many gallons of herbicide should be applied to 278 acres of corn at the time when corn plants are just breaking ground?
   _____ gallons.

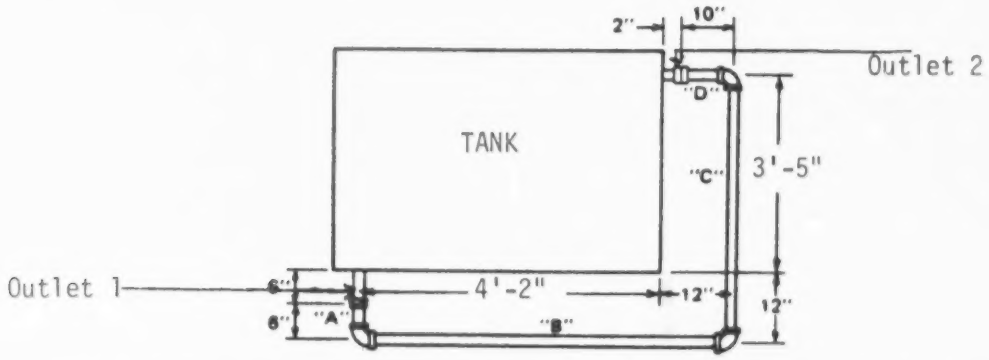
3. How many five gallon containers of the above described herbicide would need to be purchased for a regular post-emergence program for 516 acres of corn?
   _____ containers.

NAME _____

WORKSHEET

COURSE: **Agricultural Production II**

COMPETENCY: #021 - "Determine the pipe needed to run a given water line on a farmstead"



1. The two outlets on the above tank need connecting to each other. The pipe must be kept 12 inches away from the tank for insulation. Using the dimensions above, calculate the following problems.

   (a) The distance along the pipe from outlet 1 to outlet 2 maintaining 12 inches away from the tank.

   (b) The end-to-center measurements for pipes A and D. (NOTE: End -to-center measurement is from the end of one fitting to the center of another.)

   (c) The center-to-center measurements for pipes B and C. (NOTE: Center-to-center measurement is from the center of one fitting to the center of another.)

   (d) The end-to-end measurements for pipes A, B, C, and D, permitting 1/2" fitting allowance for couplings and 1 3/8" fitting allowance for elbows. (NOTE: End-to-end measurement is the actual length of pipe to be cut. End-to-end measurements are found by subtracting the fitting allowance from the center-to-center and/or end-to-center measurements.)

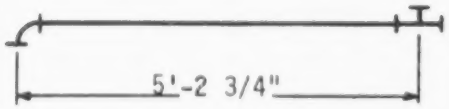
NAME _____

WORKSHEET

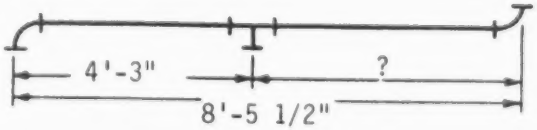
COURSE: **Agricultural Production II**

COMPETENCY: **# 023 - "Perform simple plumbing tasks on a farmstead"**

INSTRUCTIONS: Complete the following problems.



1. What would be the end-to-end measurement for the above drawing using 1 1/2 inch pipe? (NOTE: The fitting allowance for elbows for 1 1/2 inch pipe is 1 3/8 inches and the fitting allowance for threaded tees for 1 1/2 inch pipe is 1 3/8 inches.)



2. A pipe line has three fittings: two elbows and one tee. The overall measurement between elbows is 8 feet 5 1/2 inches. The distance between the tee and one elbow is 4 feet 3 inches. What is the distance from the tee to the other elbow? (NOTE: These are center-to-center measurements.)

3. Find the grade per foot of a 3 inch sink waste 7 feet long to give a required minimum velocity of 260 feet per minute. Use the following formula.

$$F = \frac{L}{10\,d}$$

F = total fall or grade per foot
L = length in feet
d = diameter of the pipe

ANSWER KEY FOR MODULE TITLED "COMMON FRACTIONS"

Module Training Unit (Addition and Substraction):

(1a.) 2/3 (1b.) 4/5 (1c.) 5/8 (1d.) 1/4 (2a.) 1/3
(2b.) 1/5 (2c.) 3/8 (2d.) 3/4 (3a.) 3/4 (3b.) 1/2
(4a.) 4 11/16 (4b.) 11 1/4 (5.) 6/11 (6.) 3/4
(7.) 17 1/10 (8.) 2 1/8 (9.) 1 43/48 (10.) 15 3/8

Module Training Unit (Multiplication and Division):

(1.) 29 8/55 (2.) 25 (3.) 28 (4.) 725 (5.) 158 1/3
(6.) 110 (7.) 7 3/16 (8.) 150 (9.) 8 (10.) 137 1/2

Module Training Unit (Combined Operations):

(1.) 18 (2.) 530 1/4 (3.) 24 (4.) $25.96 (5.) 5 1/3 (6.) 9936

Competency #017 Worksheet:

(1a.) 3/4" x 9 3/4" x 16 1/2" (1b.) 3/4" x 3 3/4" x 18"
(1c.) 3/4" x 3 3/4" x 9 3/4" (1d.) 3/4" x 3" x 4 1/2"
(2.) 6

Competency #018 Worksheet:

(1.) 5 1/4 (2.) 4 11/16 (3.) 1 1/2 (4.) 4 11/16 (5.) 2 15/16

Competency #019 Worksheet:

(1.) 23 1/3 to 46 2/3 (2.) 23 1/6 (3.) 5

Competency # 021 Worksheet:

(1a.) 10' - 11" (1b.) Pipe A = 6" Pipe D = 10"
(1c.) Pipe B = 5' 2" Pipe C = 4' 5"
(1d.) Pipe A = 4 1/8" Pipe B = 4' 11 1/4" Pipe C = 4' 2 1/4"
Pipe D = 8 1/8"

Competency # 023 Worksheet:

(1.) 5 (2.) 4' - 2 1/2" (3.) 2/5"